

## CLAIMS

What is claimed is:

1. A transimpedance amplifier comprising:
  - an input terminal to receive an input signal from a photodiode;
  - 5 an amplifier to provide an amplified voltage signal at an output terminal in response to a voltage representative of the input signal;
  - a filter to provide a filtered voltage signal in response to the amplified voltage signal, the filter comprising:
    - an off-chip capacitor comprising a terminal coupled to a circuit bonding pad; and
    - 10 a plurality of conductors formed between the circuit bonding pad and the output terminal, the conductors being insulated from one another over at least a portion between the output terminal and the circuit bonding pad.
2. The transimpedance amplifier of claim 1, wherein the input signal comprises a DC current component and an AC current component, and wherein the transimpedance amplifier further comprising a DC current removal circuit coupled to the input terminal to remove at least a portion of the DC current component from the input signal in response to the filtered voltage signal.
- 20 3. The transimpedance amplifier of claim 1, wherein the filter comprises a frequency response, the frequency response comprising a cut-off frequency caused by a first pole formed by the off-chip capacitor and the amplifier.

4. The transimpedance amplifier of claim 3, wherein the plurality of conductors is associated with an impedance, wherein the frequency response comprises a zero caused by the impedance, and wherein the amplifier introduces a second pole to cancel, at least in part, the zero.

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5. The transimpedance amplifier of claim 1, wherein the transimpedance amplifier further comprises differential output terminals to provide a differential output signal, and wherein the amplifier receives the voltage representative of the composite signal from the differential output terminals.

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6. The transimpedance amplifier of claim 1, wherein the magnitude of the filtered voltage signal is substantially proportional to the magnitude of the DC current component.

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7. The transimpedance amplifier of claim 1, wherein the plurality of conductors is formed as a portion of a semiconductor device layout.

8. A circuit comprising:
  - an input terminal to receive an input signal;
  - an amplifier to provide an amplified voltage signal in response to a voltage representative of the input signal;
  - 5 a filter to provide a filtered voltage signal in response to the amplified voltage signal, the filter comprising:
    - an off-chip capacitor comprising a terminal coupled to a circuit bonding pad; and
    - a plurality of conductors formed between the circuit bonding pad and the output terminal, the conductors being insulated from one another over at least a portion between 10 the output terminal and the circuit bonding pad.

9. The circuit of claim 8, wherein the input signal comprises an AC current component and a DC current component, and wherein the circuit further comprising a DC current removal circuit coupled to the input terminal to remove at least a portion of the 15 DC current component from the input signal in response to the filtered voltage signal.

10. The circuit of claim 9, wherein the DC signal removal circuit is coupled to the input terminal to substantially remove at least a portion of the DC voltage component from the input terminal.

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11. The circuit of claim 9, wherein the DC voltage removal circuit comprises a voltage clamp circuit.

12. The circuit of claim 8, wherein the input signal comprises an AC current component and a DC current component, and wherein the magnitude of the filtered voltage signal is substantially proportional to the magnitude of the DC signal component.

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13. The circuit of claim 8, wherein the plurality of conductors is formed as a portion of a semiconductor device layout.

14. A system comprising:  
10 a photodiode;  
a transimpedance amplifier coupled to the photodiode to provide a differential output signal;  
a data recovery circuit to provide a serial data signal in response to the differential output signal;  
15 a deserializer to provide a parallel data signal in response to the serial data signal, wherein the transimpedance amplifier comprises:  
an input terminal to receive an input signal from the photodiode;  
an amplifier to provide an amplified voltage signal at an output terminal in response to a voltage representative of the composite signal;  
20 a filter to provide a filtered voltage signal in response to the amplified voltage signal, the filter comprising:  
an off-chip capacitor comprising a terminal coupled to a circuit bonding pad; and

a plurality of conductors formed between the circuit bonding pad and the output terminal, the conductors being insulated from one another over at least a portion between the output terminal and the circuit bonding pad.

5 15. The system of claim 14, the system further comprising a SONET framer to receive the parallel data signal.

16. The system of claim 15, wherein the system further comprises a switch fabric coupled to the SONET framer.

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17. The system of claim 14, the system further comprising an Ethernet MAC to receive the parallel data signal at a media independent interface.

18. The system of claim 14, wherein the system further comprises a  
15 multiplexed data bus coupled to the Ethernet MAC.

19. The system of claim 18, wherein the system further comprises a switch fabric coupled to the Ethernet MAC.

20. A system comprising:
- a photodiode;
- a transimpedance amplifier to provide a first voltage signal in response to a current signal from the photodiode;
- 5      a limiting amplifier comprising one or more input terminals to receive the first voltage and provide a second voltage signal in response to the first voltage signal;
- a data recovery circuit to provide a serial data signal in response to second voltage signal;
- a deserializer to provide a parallel data signal in response to the serial data signal,
- 10     wherein the limiting amplifier comprises:
- an amplifier to provide an amplified voltage signal at an output terminal in response to the second voltage signal;
- a filter to provide a filtered voltage signal in response to the amplified voltage signal, the filter comprising:
- 15          an off-chip capacitor comprising a terminal coupled to a circuit bonding pad; and
- a plurality of conductors formed between the circuit bonding pad and the output terminal, the conductors being insulated from one another over at least a portion between the output terminal and the circuit bonding
- 20          pad.

21. The system of claim 20, the system further comprising a SONET framer to receive the parallel data signal.

22. The system of claim 21, wherein the system further comprises a switch fabric coupled to the SONET framer.

5 23. The system of claim 20, the system further comprising an Ethernet MAC to receive the parallel data signal at a media independent interface.

24. The system of claim 23, wherein the system further comprises a multiplexed data bus coupled to the Ethernet MAC.

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25. The system of claim 23, wherein the system further comprises a switch fabric coupled to the Ethernet MAC.

26. A filter comprising:  
15 an input terminal to receive an input signal;  
an off-chip capacitor comprising a terminal coupled to a circuit bonding pad; and  
a plurality of conductors formed between the circuit bonding pad and the input terminal, the conductors being insulated from one another over at least a portion between the output terminal and the circuit bonding pad.

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27. The filter of claim 26, wherein the plurality of conductors is formed as a portion of a semiconductor device layout.